

The Potomac Aqueduct
Georgetown Abutment at the Georgetown
Waterfront, adjacent to extension of
36th St., N.W.
Washington (Georgetown)
District of Columbia

HABS No. DC-166

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PHOTOGRAPHS
WRITTEN HISTORICAL AND DESCRIPTIVE DATA

Historic American Buildings Survey
Office of Archeology and Historic Preservation
National Park Service
801 19th St., N.W.
Washington, D.C.

THE POTOMAC AQUEDUCT

Location: Georgetown abutment: at waterfront, adjacent to extension of 36th Street (west side). Adjacent, Potomac Boat Club, 3530 Water Street, N.W., Washington, D.C.
Pier No. 1 and South Abutment remnants: west of junction of Key Bridge and Virginia shore.

Present Owner: National Park Service

Present Occupant: The Potomac Boat Club stores boats under the southern arch of the Georgetown abutment.

Present Use: Boat storage (below), flower garden (in trough) of Potomac Boat Club.

Statement of Significance: An important and well preserved remnant of one of America's earliest engineering triumphs. Intimately connected with the Chesapeake & Ohio Canal, and the development of commercial Georgetown in the early 19th century.

PART I. HISTORICAL INFORMATION

A. and B. Physical History, and Historical Events:

The expected success of the Chesapeake and Ohio Canal, which would bring great amounts of inland produce to the port of Georgetown, spurred quick action across the Potomac, in Alexandria. As a rival port to Georgetown, merchants soon conceived the idea of linking their city with the Chesapeake and Ohio Canal by an extension of the canal, which would thus make Alexandria just as desirable a terminus for canal traffic as Georgetown. In 1830, Congress granted a charter to the Alexandria Canal Company, and negotiations were started for linking it with the Chesapeake and Ohio. The two would have to be joined, across the Potomac, by an aqueduct bridge which would allow the canal boats to cross the river without unloading their cargoes into sailing ships, which would have made the extension of the shipments to Alexandria prohibitively expensive in comparison to Georgetown. This aqueduct was begun from the Virginia side of the Potomac in 1833, the same year that the seven mile branch canal to Alexandria was begun, and both were completed ten years later, in 1843.

The aqueduct bridge, "a stupendous work," was considered one of the most remarkable engineering achievements of the

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time: it was almost a quarter of a mile long, and its piers were founded on solid rock, below 35 feet of water and mud at places. It was published and proclaimed in America and abroad. Today there are three vestiges to be seen: a stone course from the northern tip of the Virginia causeway abutment, below and to the west of Key Bridge; one of the original stone piers, protruding about 6 feet from the water level in front of this causeway remnant; and on the Georgetown side, the massive aqueduct abutment of two stone arches which was built by the Chesapeake and Ohio Canal. The heavy and impressive stone work, as well as the total impression of the massive structure, is reminiscent of the Augustan Porta Maggiore in Rome, which also carried water across the top.

Probably few structures of this kind can be documented as well: one can trace its progress almost day to day in the reports and day-accounts of Major William Turnbull of the United States Topographical Engineers. Because of the U.S. Government's interest in improving domestic trade and communication, and also undoubtedly because Alexandria was at that time still within the District of Columbia, Congress passed an act on June 25th, 1832 providing \$100,000 toward the work. Major Turnbull was assigned supervision of the construction by the Army Topographical Engineers. On March 3rd, 1837 \$300,000 more was provided by Congress.

- 1829 The site for the abutment had already been fixed by engineers of the Chesapeake and Ohio Canal, Messrs. Wright and Roberts in 1829; nothing further was done, however. After being appointed to carry out the project, Major Turnbull conducted his own examination of the river bottom and the site starting
- 1832 in late August, 1832. His survey showed a greater depth of the river and mud than suspected, and he elected to take a different angle, one that was at right angles to the flow of the water rather than the oblique angle of Wright and Roberts. He then applied to the Mayor of Georgetown to use the lower part of 35th Street for the abutment site because, as he suggested, "it might be of advantage to the town to unite with the Alexandrians in constructing a roadway upon the piers of the aqueduct. This suggestion met with the decided approbation of the mayor...." (House Doc. 459, p. 3). Unfortunately, the matter was referred to the councils, who each appointed a committee. They agreed to let him use the street "next west of the one designated" but could not act definitely on the site, and nothing was done. Thus, Major Turnbull reports, "we were compelled by circumstances beyond our control... to fix the abutment upon the site designated by Messrs. Wright and Roberts," which was adjacent to the west edge of the extension of 36th Street. (It did not, therefore,

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form an extension of the street as he had hoped.) "I narrate these facts," Major Turnbull explains, "that professional men commenting upon the position of the axis of the aqueduct, which is oblique to the stream, may be informed that neither Mr. Fairfax [the engineer of the Alexandria Canal Co.] nor myself had any agency whatever in placing it where it is." (House Doc. 459, p. 3) In view of these difficulties in securing the abutment site, it is indeed ironic that on July 4th, 1836 by act of Congress it was provided that "the Corporation of Georgetown...be and it is hereby authorized to sell in fee simple, or otherwise dispose of and convey all that portion of Fayette St. (35th) and Lingan St. (36th) in said town, lying south of the canal...." The 36th St. extension went to Thomas Brown and Robert P. Dodge.

The plan of the aqueduct was also altered from Major Turnbull's original ideas. "Having no instructions on this point, we were left entirely to the guidance of our own judgement.... It was to consist of twelve arches of stone, supported by eleven piers and two abutments; the arches to be one hundred feet span and twenty-five feet rise.... This plan was approved of by the president and directors, with the exception of the superstructure, the cost of which, being beyond the limited means of the company, was left for after consideration. The plan was further altered by rejecting the abutment piers; but eventually these were restored, on the recommendation of the engineers. A causeway of earth, three hundred and fifty feet in length, was substituted for three of the arches at the southern extremity of the work.

"The adoption of the causeway made a change in the arrangement of the piers necessary; and it was then decided that the aqueduct should consist of eight piers, one hundred and five feet apart at high-water mark; the southern abutment to be twenty-one feet thick, with circular wing walls, thirteen feet average thickness at the base; sixty-six feet in length on each side, to connect with the slope walls of the causeway. The northern abutment, which is to be built by the Chesapeake and Ohio Canal Company, is not yet decided upon. Each of the piers to have an ice breaker on the up-stream end." (House Doc. 459, p. 3)

1833 Advertisements for bids to build the aqueduct, following the above outline, were published on January 29, 1833, and a number of bids were received, varying from \$99,092.13, to \$247,909.63. The procedure seems to have been thereafter to hire out specific parts of the work to different firms. The first one contracted built coffer dams on a new and improved plan, since none to sustain the pressure

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of 35 feet of mud and water had heretofore been built. These cofferdams were a complete and utter failure; the water within rose and fell with the tides, no matter how vigorously the pumps worked.

- 1834 Work was begun again, with new machines, in January, 1834. It took from March 4th to March 26th to pull out all the old cofferdam, and a new and heavier type was made, in which an inner wall was constructed from 40 foot timbers, and an outer wall of 36 foot piles. This was sunk into the mud, the inner piles driven down to bed rock (through 18 feet of water and 17 feet 4 inches of mud at Pier No. 2, with which they began) and the outer piles driven well into the mud. The space between the piles was filled with clay puddling. The outer piles should have been 40 feet long also, for much difficulty with mud oozing in from the bottom, and leaks occurring plagued the work. The shorter outer piles had been chosen in an unfortunate search for economy.

The achievements of Major Turnbull are more remarkable since few such cases in founding large stone piers on solid rock had ever been done before, and none at this depth. On September 2, 1834 pumping was begun on the water inside the dam, but due to many accidents, breaks in the machinery, ruptures in the cofferdam, and so on, for weeks only about one hour's worth of pumping could be achieved on any given day. Excavating machinery could finally be put in place in October, but again, breaks and flooding held up work. By October 22, six feet of the mud had been removed, but pumps broke, mud oozed in, leaks kept appearing and flooding the excavation, dredging machinery was buried by sand, ropes broke and stretched, laborers would not work in cold weather, and other such disruptions made the work a nightmare.

"I had been much disheartened by these frequent leaks and incursions of sand...it was not very pleasant to recollect that the other dam (No. 1) [begun in June, 1834] was constructed upon precisely the same plan as this, and that, consequently, the same difficulties might be reasonably anticipated." (House Doc. 459, p. 15) Cold weather also added to mechanical difficulties for it made cast iron brittle and more easily broken. On November 23rd, "during the night it was so stormy that it was impossible to keep lights" as they attempted to replace a broken crankshaft.

Major Turnbull was determined, however, to press on with the work. On December 3rd, rock bottom was finally reached in the cofferdam for pier No. 2, but constant incursions of mud, that slipped under the puddling (because the outer

1835 piles were not at bedrock) settling of the puddling, constant breaking of the pumps and other machines held up masonry construction until January 3rd, 1835. The next day the river froze over, preventing barges from bringing in stone, and work had to be suspended after protective shields had been built around the cofferdam. HABS DC GEO 1-

Somewhat understandably, Congress did not continue its financial support in 1835, but private citizens raised money and work began again on April 22nd. Masonry construction got under way, the blocks of stone being lowered into the site by derricks, set on rails, and operated each by 4 men and a boy. "Stones weighing from three to four tons were, by these means, hoisted up and lowered into the dam with great ease." (House Doc. 459, p. 19) The finest cement was used throughout, and the ice breaker at the head was made from carefully cut granite from Sandy Bay, Massachusetts. By June 21st, the masonry was above the top level of the dam, and now hoists were used. This work was inspected on June 20th by President Andrew Jackson, and two of his cabinet members, and (with remarkable confidence) the water pumps in cofferdam No. 1 were demonstrated.

The masonry for Pier No. 2 was finally completed on August 1st, 1835; the total cost of the masonry, including the cutting and transportation was \$6,986.18.

This account gives a fair impression of the first pier constructed. Detailed plates of the dams, their framing, the machinery, and the site were published as well as the report, and thus was equally important to the engineering world as to the Government.

On June 23rd, 1835 work was begun on Pier No. 1, the cofferdam of which had been put in place shortly after that of No. 2. Major Turnbull's fears were well founded, and besides all the familiar problems that he had met with the cofferdam for Pier No. 2, the puddling had been in place so long that it was compacted, and would not settle to fill the many leaks that opened up. The final solution was to use a pile driver over the leak. On July 1st of the same year, the cofferdam for the south (causeway) abutment was begun, and by constructing a floating saw mill, work was greatly speeded up. Work was suspended on December 5th.

1836 And thus work continued slowly, learning from previous mistakes. Construction for 1836 began on March 22nd, but new difficulties plagued Major Turnbull and his crew. On June 2nd, the water was 5' 7" above the ordinary point

of high water, and thus not only were the cofferdams several feet under water, with one of the steam engines swept off, but the currents also eroded out mud and puddling from the bases of the dams, causing some damage. But pumping out the water was still their most difficult task: "On the 20th [of July], the dam was pumped out again, but soon filled. August 4. Another attempt was made to free the dam, but with no better success than heretofore; it was emptied, but filled again immediately." (House Doc. 459, p. 71) Work on the south abutment and on the dam of Pier No. 1 continued, and by November work could begin on masonry of this pier which once started, progressed speedily. This time, although the river froze over in November, a channel was kept open by a barge continually plying back and forth from the cofferdam to shore.

- 1837 In 1837, work began speedily in January with the completion of Pier No. 1, and continuing on the south abutment. Work
1840 thus progressed on the piers until 1840, when the last one was completed.

Building the piers of the aqueduct bridge, then was arduous and constantly beset with difficulties; the annual "Report from the Topographical Bureau," of 7 November 1837 stated: "A more difficult work has been rarely heretofore undertaken. It may with propriety be considered, for boldness of design and skillfulness of execution, as unprecedented among works of that kind." (p. 3) The following year, the Report of 26 November 1838 went further to say that the bridge "is probably one of the most extraordinary works of modern times, equally adapted to reflect credit upon the country as upon its engineer's skill." (p. 367)

- The northern abutment, which still stands today on the Georgetown waterfront, was a less difficult task. Plans
1828 for it go back to 1828 when the Chesapeake and Ohio Canal directors noted the plan to extend the canal "from the basin at the western line of Georgetown to Rock Creek." Mention was also made of the contemplated canal extension to Alexandria: "it is proposed that a suitable site be procured, and a proper abutment be erected...to support the commencement of the aqueduct." The previous year, on July 31st, 1827, a freeholders meeting in Alexandria had resolved to subscribe \$250,000 to the Chesapeake and Ohio Canal so that Alexandria could benefit from a lateral canal linked with it. The Alexandria Canal Company formed in 1830 had great difficulty in prompting the Chesapeake and Ohio Canal Company to construct the northern abutment,
1831 and from April 1831 to July 1836 many "respectful but urgent applications" were submitted to them. Since little was done the aqueduct bridge was, as we have seen, begun
1833 from the south (Alexandria) side instead, in 1833.

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- 1836 On July 28, 1836, a resolve was passed to start work on the northern abutment, following the plans of Major Turnbull, but was put off by the stock holders, and much discussion about the expected expense took place. On May 28, 1838, Major Turnbull sent copies of the abutment plans to Mr. T. F. Mason, President of the Chesapeake and Ohio Canal Company, which showed the changes that Mr. C. B. Fisk of the Chesapeake and Ohio thought advisable. The original plan of the abutment, which was compatible with the then proposed arched aqueduct bridge, had been drawn up in 1832.
- 1837 The report that Colonel J. J. Abert made on the northern abutment of the Potomac aqueduct (12 June 1837) gives us a good idea of planning two years before work was actually begun on it. He states that the rest of the aqueduct was of plain and sturdy construction, and thus was not frivolous or expensive, and the Chesapeake and Ohio Canal Company could have no real objection in continuing it in the same style. The arched plan which was proposed was more expensive than the causeway on the Alexandria side, but in Georgetown it had to cross a street and so could not be a solid abutment. And, most interestingly, Colonel Abert recognized aesthetic factors: "There is no doubt the expense of this connecting structure could be much reduced by the simple erection of stone piers to sustain a wooden trunk; but the undersigned, for one, would regret a plan which would so disfigure the town, and, therefore, recommends that the work necessary to carry the connecting basin across the street should be an arch of stone." (p. 15)
- Mr. Fisk presented the plans again to the Board, with an estimate of its cost, showing where the site would be, and how it would attach to the canal, on July 19, 1837 and agreement was finally reached.
- 1839 Actual work on the abutment began in 1839: in Major Turnbull's report of December 31st, 1839 he notes that "piers Nos. 6 and 8, and the portion of the northern abutment which is upon the shore" were worked on. Excavation of the foundation of the northern abutment, the southern part of which would rest in the water, cost \$975.06 1/4. The model of the wooden superstructure of the bridge itself was made at this time, at a cost of \$64.62 1/2. (Sen. Doc. 178, pp. 20-22)
- 1840 During 1840, work on the abutment sped along. Between March 31st and April 3rd, an old wharf on the site was removed, and on April 6th, the frame of the abutment cofferdam was put in place, and by May 23rd, it had been completed,

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pumped out, and mud excavation began. On May 30th, the excavation was complete "and the rock was swept off. The mean depth of the rock below high water mark was 19.8 feet; the lowest point was 25 feet below high water." (Sen. Doc. 178, p. 41) Masonry was begun on June 3rd, and by the 24th it was two feet above the high water mark. On July 27th, they "commenced setting the ring-stones of one of the arches in the northern abutment" and on the 30th "the centre of the second arch" was placed. On the 10th of September he could note that "one of the arches in the northern abutment was closed today." A break in the canal wall held up work from October 12th to November 5th, since no stone could be transported to the site.

On the night of November 11th, however, a disastrous fire occurred. It destroyed a warehouse, "a large carpenters shed, under which the framing of the superstructure was going on; a truss, nearly finished; 270 pieces of North Carolina timber, which had been kyanized and dressed for the stringers of the superstructure; and many other articles of value, including the model of the superstructure." (Sen. Doc. 178, p. 43)

Work was soon resumed, however, and on November 23rd, the second arch in the northern abutment was completed, and on the 30th removal of the cofferdam around the southern end was begun. It is interesting to note that in 1839 and 1840, when most of the work on the abutment was done, the total itemized expenses came to \$39,519.13, with the removal of the cofferdam costing \$462.59 1/4. The stone had cost \$7,484.45 1/2, and the cutting of it \$380.93 3/4.

Major Turnbull's report of December 31st, 1840 with work near completion, was full of optimism. The last pier was completed, and the northern abutment lacked only the parapet walls. "When I reflect upon the numerous difficulties which we have overcome in the progress of the work, and recall the disheartening predictions of that numerous portion of the community who looked upon the attempt to establish foundations at so great a depth, and in a situation so very exposed and dangerous, and who did not fail to treat it as an absurdity, I cannot but congratulate myself upon having so happily succeeded; and whilst so doing, I recollect, with a very grateful sense of what I owe them for it, the very generous confidence which the president and directors of the company always reposed in me." (Sen. Doc. 178. p. 35) The success of the piers was shown by a spectacular and violent breakup of the ice in February which did not harm them in the least.

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The final stage of work was devoted to the superstructure. This, as we recall, was to be of wood, constructed in the manner used essentially for covered bridges in which wood trusses supported the load between piers.

"Early in the year our attention was given to the plan of the superstructure for the aqueduct, which, from the limited means of the company, had necessarily to be of wood. The several ingenious plans of wooden superstructures used in the country were duly considered; but one perfected by Mr. Benjamin F. Miller, the master carpenter and principal superintendent of the work, was preferred; and a model, constructed on his plan, having been tested in the presence of the president and directors and several scientific gentlemen, was adopted by the president and directors who, with the same laudable desire which has always governed them, to render the work as permanent as possible, ordered that all the timber used in the superstructure should be subjected to 'Kayan's process' for preserving timber." (Sen. Doc. 178, p. 37). White oak and North Carolina heart pine was used. (The finished superstructure was 28 feet wide, with a trough 17 feet across and 7 feet deep, and a tow path five feet wide next to it. The length was 1100 feet.) (Jackson, Chronicles of Georgetown, p. 129)

- 1841 The following year saw the completion of the north abutment, and half of the wooden framework for the water trunk
1842 was in place by November 15th. In 1842 the report from the Topographical Bureau could announce that "the frame to sustain the canal trunk [has been completed] and the work is now in such a state of forwardness that no doubt is entertained that the water may be let into it during the course of the next season." (House Doc. 2, p. 276)
- 1843 The complete bridge was finally opened for use on July 4th, ten years after work was begun on the Virginia side. The local enthusiasm over this engineering feat can be glimpsed in contemporary guidebooks.

William Morrison's guide, published in 1842 before the bridge was quite complete, includes a (completed) engraving of the bridge which makes it look as though its framework sides were covered with sheathing. Since this was the practice with covered bridges of the period, in order to preserve the timber trusses, (which were untreated), the artist may have thought that a sheathing would ultimately be added. Mr. Morrison points out that the piers of "this stupendous work" were built of granite and founded on solid rock "so as to withstand the shock of the spring ice, which, rushing furiously from the stormy regions of the falls and narrows above, passes with almost resistless

force against the bridges of the Potomac...." The aqueduct piers, however, "built in the most masterly manner, will bear up against any force that may be brought against them." (p. 75) Charles Lanman, writing in Bohn's Hand-Book of Washington in 1861, also feels that "stupendous" is the best word for the bridge, and notes that it has "attracted the attention of European as well as American architects and men of science." (p. 108)

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In the 1853 Washington and Georgetown Directory the author observes that "it has attracted the notice of every scientific architect in Europe and America; even Prince Albert's attention was called to it, though unfortunately he placed its locality upon the Delaware." (p. 67) Mr. Jackson in his Chronicles emphasizes its uniqueness in America: "The construction of two abutments and light piers of stone, built upon the rock of the river at a great depth below the surface, was a triumph of engineering skill, not surpassed by any similar work in the country." (p. 126.) A description of the Aqueduct Bridge in 1859 is also recorded by an anonymous traveler in an account he wrote thirty years later: "At Georgetown the canal crossed the Potomac on a long wooden bridge or aqueduct built similar to a carriage bridge but instead of a roadway it had to support a box filled with water through which the boat sailed. This required that the sides should be braced and made sufficiently strong to keep the water from pressing them out. At the very top was a narrow tow path and rail to keep the mules and driver from falling into the river below. After the river is crossed, the canal runs through a nearly level country...." ("Life on the C. & O. Canal: 1859," edited by Ella E. Clark, Maryland Historical Magazine, v. 55, No. 2 June, 1960, p. 115.)

1856 The history of the aqueduct bridge does not stop there, however, for the superstructure was changed several times. The need for a substantial bridge across the Potomac had grown to such a point that the narrow carriage lane across the aqueduct bridge was inadequate by 1856, and the House of Representatives requested on March 10th information regarding a bridge across the river at Little Falls, or near Georgetown, or the purchase of the right of way over the piers of the aqueduct bridge. In response to this, Major Turnbull wrote a letter on March 25 stating his views. It was far more economical to use the old piers, as they were built to hold a far heavier superstructure. "A doubt exists with me whether the constant jar of the travelling on the bridge would not cause the aqueduct to leak if constructed of wood, or a combination of wood and iron. I would prefer a superstructure entirely of Iron" which he thought could be built for about \$500,000.

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(House Doc. 97, p. 5) This was almost the same as the total cost of the original aqueduct bridge which Joseph Eaches, president of the Alexandria Canal Company (in his letter, March 15th) estimated cost \$575,381.43, including about \$50,000 for the trough and superstructure. Mr. Jackson in his Chronicles simply states that it cost a total of \$600,000, with the locks at Alexandria \$50,000 (p. 126).

- 1857 The following year the Secretary of the Interior reported on his survey, and had a number of suggestions for the proposed bridge. He envisioned nine stone arches, of 105 foot span, that would support the aqueduct. Then, "pillars of masonry, resting partly on the pier-head and partly on the coping, support a superstructure of boiler plate girders, 8 feet deep, spanning the distance from pier to pier, and bringing the level of the roadway to thirty-two feet across the aqueduct." (Sen. Doc. 40, p. 10. 9 February 1857). This system had been tried in England and had been successful, and he also thought a railroad might cross it as well. A partition on the bridge would separate the road from the railway, and he estimated the cost at about a million dollars. "The boiler plate girder has been adopted as being very reliable, presenting great durability, and in keeping with the massive architecture of a heavy stone bridge." (p. 11) This indicates an interesting attention to the aesthetic problems of combining stone and ironwork.

These substantial plans to revamp the bridge were cut short by the Civil War.

- 1861 On May 23, 1861, the aqueduct was drained by the United States government, and the bed was used as an ordinary bridge, a wooden approach bridge crossing the Georgetown canal, and connecting 36th Street with the abutment.
- 1866 After the war, in 1866, it was returned to the Alexandria Canal company, who leased it to the Alexandria Railroad and Bridge Co. In 1868 Congress authorized them to erect a highway bridge over the trough, and charge tolls.
- 1868 The original Queen-post truss bridge was removed, and a new wooden superstructure added of the Howe truss type, but strengthened at the sides with laminated wooden arches. This should not be confused with the Burr truss, which also employs large arches, but which are boxed in with kingpost braces. Both the Howe truss and Burr truss were used extensively in covered bridge construction at the time.

The new bridge had two levels, the lower chord of the truss supporting the canal trough and tow path, and the

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upper supporting the toll road. As Major Turnbull predicted in 1856, however, the trough of this double-decker bridge leaked, which photographs of the 1880's show very clearly. Mr. Richard Jackson in his Chronicles of 1878 noted: "It has now been ten years since it was reconstructed, and from present appearances, it will have to be rebuilt again to hold water and sustain the weight of travel." (p. 130)

1885 Because of local objection to the high tolls, Congress authorized the purchase of the bridge in 1881, but the Alexandria Canal Company refused to sell it. In December 1885 Congress authorized \$125,000 to buy the bridge, but when the Company still did not respond, the bridge was condemned and closed to all but foot traffic. In December 1886, the Alexandria Canal Company finally accepted the \$125,000.

1888 The superstructure was again changed. A light iron truss bridge was put on the existing stone piers, supervised again by a member of the U.S. Army Corps of Engineers, Peter C. Hains, and was opened for public use June 30th, 1888. Its cost was \$80,905, and the approaches over the Canal an additional \$50,000.

1903-5 In 1903-1905 Pier No. 5 was completely replaced, and not surprisingly we find that "some difficulties were encountered during the pumping out and making water-tight of the cofferdam" (Annual Report of the Chief of Engineers, 1906, appendix CCC). In the following years, other lesser repairs were made to the piers. But need for a larger and more substantial bridge led to Congressional authorization in 1916 for a replacement, and in 1920 the present Key Bridge was begun, and opened to the public on January 17th, 1924.

1933 The two bridges existed side by side for many years until the iron superstructure and the upper part of the piers were removed in 1933. In order to eradicate an "eyesore" and enable local rowing meets to have nine full lanes, all but one of the piers were blasted out by Army Engineers in September to December, 1962 to a depth of 12 feet below the low water line. The rubble was taken to Anacostia Park where it was used as foundation for sea walls. Pier No. 1 was retained, and juts above the water about 6 feet, 30 feet from shore.

The stone abutment on the Georgetown side stands essentially as it was built, except for the northern arch which was raised between 1900 and 1909 to enable railroad cars to

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pass under it. Today, two types of iron fencing are to be found on the top of the abutment. One is cast in a gothic lancet pattern and fastened into the masonry itself at the edges of the stonework, and probably dates from 1868. The other, far more utilitarian, made of riveted strips, originally was the guard rail for the 1888 iron bridge which was carried across higher than the abutment itself.

Date of erection:

The stone piers and abutments: 1834-1841

The Georgetown abutment: 1839-1841

The original wooden superstructure: 1840-1843

Architects:

Original wooden superstructure: Benjamin F. Miller, master carpenter.

Stone piers and abutments: Major William Turnbull, U.S. Army Corps of Topographical Engineers, with suggestions of Mr. Fairfax, engineer of the Alexandria Canal Co.

William Turnbull, the man who designed the bridge, was chief engineer, invented the necessary special machinery and cofferdams, oversaw the work, kept track of the daily progress, and negotiated with the directors and commissioners of both canal companies for 11 years deserves greater recognition for this important early feat of American building. The Dictionary of American Biography, (Charles Scribner's Sons, N.Y. 1931, v. XIX, p. 57) gives an account of his life. In brief, he was born in Philadelphia, Pa. in 1800, the son of William Turnbull, a shipping merchant and iron master who came from Scotland about 1770. William Turnbull, the son, entered the U.S. Military Academy in 1814, and graduated in 1819. He was then assigned to the Corps of Artillery and was mainly engaged in topographical duty until 1831 when he was transferred (as captain) to the Topographical Engineers. After a survey (1831-2) of a railroad route in Mississippi, he was assigned to the construction of the Potomac Aqueduct. During this period of eleven years, he was promoted to the rank of major. Thereafter he worked on harbor improvements on the Great Lakes and on Lake Champlain. In the Mexican War (1846) Major Turnbull served as chief topographical engineer on the staff of Gen. Winfield Scott, and was active and gallant in all operations. For his services he received the brevet of lieutenant-colonel, and later colonel. After the war he was superintending engineer of the construction of the

New Orleans Customs House (1848-49) and continued surveys of harbors and rivers for canals, lighthouses, and bridges. From 1826 until his death on Dec. 9, 1857, he lived in Washington with his family. The 1843 Washington directory lists him as living at "N. side F n, btw. 20th and 21st W nr cen.", and in 1846 simply "N side F n, bt. 20 and 21 w."

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Important old views: A great number of photographs of the bridge in all its various forms are available (Fine Arts Commission, National Park Service, Library of Congress, Peabody Room, Georgetown Public Library, etc.). A selection is included with this data book.

C. Sources of Information:

1. Primary and unpublished sources:

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August, 1967

PART II. ARCHITECTURAL INFORMATION

A. General Statement:

1. Architectural character: The arched stone abutment on the Georgetown shore is the largest and best preserved remnant of the Potomac Aqueduct Bridge. The bridge, begun in 1833, was one of the era's great engineering feats. Records from similar constructions of the past, such as Strickland's Reports on Canals, Railroads, and Other Subjects, (1826) probably aided Major Turnbull in erecting this structure. The first bridge, composed of a canal channel and towpath was completed in 1843. The aqueduct consisted of a water-proofed timber trough with queenpost trusses. A stone abutment supported the bridge on the Georgetown side, and an earth and stone abutment on the Alexandria side. Eight stone piers with icebreakers carried the trough between. The Aqueduct Bridge terminated its service in 1933. Only the Georgetown abutment and one pier, and a remnant of the

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Alexandria abutment remain as evidence of the fine construction methods of the past.

2. Condition of fabric: Though altered by raising the northern barrel vault to enable the railroad to pass under, the Georgetown abutment remains essentially the same as built. Except for a concrete soffit, this alteration is undiscernable to the unknowing eye. The voussoirs, spandrels, string course, and coping stones all appear in good condition. The extrados of the northern (modern) vault and a variety of vegetation project from the canal bed.

B. Detailed Description of Exterior:

1. Overall dimensions: The abutment is rectangular, with rounded corners at the southern end, and a splayed revetment at the northern end (where the canal entered.) It measures 138' 9" x 59' 3" excluding the revetment. There are two segmental arch barrel vaults running east-west.
2. Foundations: Squared masonry of sandstone and limestone to grade.
3. Wall construction: The materials are scabble-faced, squared-stone masonry of gray and brown limestone and sandstone set in hydraulic cement. Continuous string courses and a coping of rusticated stones project one foot. The string courses occur at the top and bottom quarter points. The upper string course, due to the raised northern vault, is discontinuous. A fourteen-foot wide pier strip occurs between the vaults, and twelve foot strips on either side. As mentioned, the northern soffit is concrete. The southern one is original with a scabble-faced squared-stone masonry intrados.
4. Structural system, framing: Load bearing stone walls and vaulting.
5. Porches, stoops, bulkheads, etc.: Wing wall of scabble-faced squared-stone masonry with continuous rusticated copings and string courses retain the southern berm of the Chesapeake and Ohio Canal. Beside the eastern revetment runs a series of concrete steps to the southern towpath.
6. Chimneys: Not applicable.
7. Openings: Not applicable.
8. Roof:
 - a. Shape, covering: Not applicable.

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- b. Cornice, eaves: A rusticated stone coping projects one foot from the wall continuously about the east and west crowns. Above the pier strips the coping has a thickness of nine feet, but eight feet elsewhere.

9. Dormers, cupolas, towers: Not applicable.

C. Description of the Interior:

Under the northern vault is a poorly paved road and railroad tracks. The southern vault shelters stored boats of the Potomac Boat Club.

D. Site:

1. General setting and orientation: The aqueduct bridge is oriented north - south between the Chesapeake and Ohio Canal and the Potomac River beyond the western terminus of the Whitehurst Freeway. It is also just west of the Potomac Boat Club. The Washington Canoe Club is about a hundred meters to the west.
2. Enclosures: Atop the east coping runs a section of wrought, and cast iron balustrade.
3. Outbuildings: None.
4. Walks: None.
5. Landscaping: South of the berm revetment, a disorderly undergrowth engulfs the walls and trees. This end retains the Chesapeake and Ohio Canal's southern towpath berm, which is now used for recreation.

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September, 1967

ADDENDUM TO:
POTOMAC AQUEDUCT
~~Georgetown Waterfront~~
Georgetown abutment at Georgetown waterfront
Washington
District of Columbia County
District of Columbia

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PHOTOGRAPHS

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